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INTELLECTUAL PROPERTY

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EUROPEAN PATENT OFFICE
International Searching Authority
Patentlaan 2
NL-2280 HV RIJSWIJK
THE NETHERLANDS

Our ref.: G/SDG/p/89102 PCT

Dear Sirs,

Re.: International Patent Application No. PCT/EP2005/000111
Applicant: Dresser Italia S.r.l.

A preliminary examination of the application in re is expressly requested and the fees are herewith paid.

Applicant has amended the original set of claims as follow.

The original set of claims has been amended in response to the objections raised by the Examiner contained in the Written opinion dated 13.05.2005.

In particular, a new set of claims is enclosed herewith to replace claims 1-9 as filed in which:

- original claim 1 has been amended;
- original claims 2 has been maintained unchanged;
- original claim 3 has been deleted and it has been substituted by a new claim 3;
- original claims 4-9 have been maintained unchanged.

Original claim 1 has been amended by inserting the features contained into original claim 3.

New claim 3 has been introduced by claiming the following feature: "the cylindrical element is a hermetic container into which a pressurised gas, for example nitrogen, is inserted". Said feature is supported from the original description at page 7 lines 16-20.

The features added in new claim 1 and in new claim 3 refer to the design of the actuator.

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Ing. Barrando & Leonardo

PCT/EP2005/000111 - (89102 PCT)

November 10, 2005

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One of the purpose of the present invention is to obtain a reliable actuator both with reference to the mechanical part (i.e. the shaft the gear or the electric motor) and with reference to the electronic part (the submarine electronic control unit).

The solution according to the present invention refers to an actuator in which the submarine container comprises a box-shaped element 2 and a substantially cylindrical element 3 made in a single body or connected together. The box-shaped element 2 is filled on the inside with a lubricating liquid, for example a high-density insulating oil, in a way to protect the mechanical part and in a way to being able to compensate the external pressure. The cylindrical body is a hermetic container into which a pressurised gas, for example nitrogen, is inserted, which encloses the electronic control boards for the motors inside it.

This means that the actuator of the present invention has two kind of protection an oil protection for the mechanical part and a gas protection for the electronic part which can be affected from air humidity etc...

The two body are advantageously separated each other by hermetic elements.

The electrical connections between the electronic control board and the motors are carried out by means of electric cables 7 connected to said cylindrical element and to said box-shaped element through connectors and hermetic through element.

Document D1 of the search report and cited from the Examiner in the written opinion do not describes the shape of the container. Furthermore, no indication in such document relating a gas protection for the electronic units can be found. In general, such document do not teach any solution to overcome the problem of the reliability of submarine actuator.

In view of the foregoing, a favourable reconsideration of the above application is respectfully requested.

Respectfully submitted
Authorised Representative
Alessandro Coppo

Encl.: New set of claims 1-9;
Fee Calculation Sheet;
Demand.

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CLAIMS

1. Submarine actuator for the actuation of a submarine device comprising a container body from which a drive shaft projects that is suitable for inserting in a seat of said submarine device and suitable, through its rotation, for actuating said submarine device, characterised in that said shaft is moved by at least one electric motor arranged inside said container body and actuated by an electric control signal generated by 10 a remote control station,

characterised in that

said container body comprises a box-shaped element, inside which at least one electric motor and said drive shaft are arranged, and a substantially cylindrical element inside which there is an electronic control board for said at least one motor.

15 2. Actuator according to claim 1, comprising two electric motors suitable for moving said drive shaft independently from each other.

20 3. Actuator according to claim 1, said container body comprises a box-shaped element, inside which at least one electric motor and said drive shaft are arranged and a cylindrical element inside which there is an electronic control board for said at least one motor.

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3. Actuator according to claim 1, wherein the substantially cylindrical element is a hermetic container into which a pressurised gas, for example nitrogen, is inserted.

5 4. Actuator according to claim 2, wherein said motors are couplet with the drive shaft through a gear mechanism, which comprises a transmission shaft, connected through a pair of gears to the rotation shafts of the two electric motors, on such a 10 transmission shaft a worm screw being foreseen, integral with the rotation of said shaft, which engages with a further sprocket made on the extension of said drive shaft inside said container body.

5. Actuator according to claim 1 3, comprising a device 15 for the compensation of the external pressure comprising a membrane accumulator, firmly connected on a side of said box-shaped element that injects pressurised oil inside it through an inlet pipeline, in order to equalise the internal pressure and the 20 external pressure.

6. Actuator according to claim 1 3, wherein said drive shaft completely crosses the box-shaped element and, on its upper end, a visual recognition device of the position taken up by the submarine device controlled by

the movement of the drive shaft is made.

7. Actuator according to claim 6, wherein on such an upper end of the drive shaft a seat is formed for the insertion of a possible robotised arm suitable for
5 rotating the drive shaft in an emergency situation in which it is not possible to actuate the drive shaft electrically.

8. Actuator according to claim 1, wherein the power supply of said at least one electric motor can be
10 carried out through a suitable power supply cable transported by the remote control station to the submarine actuator.

9. Actuator according to claim 1, wherein the electrical power supply of said at least one electric
15 motor can be directly obtained from electrical power supply lines associated with the controlled submarine device.